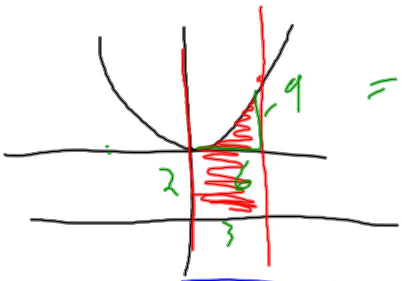
Find the area under $y=x^2$
between $x=0$ & $x=3$.

$$\text{Area} = \int_0^3 x^2\,dx = \frac{x^3}{3}\Big|_0^3 = \frac{27}{3} - \frac{0}{3} = 9$$

Find the area between $y=x^2$ & $y=-2$
between $x=0$ & $x=3$



$=15$

Geometric Approach

cancels out

$$y=x^2 \rightarrow \int_0^3 x^2\,dx \rightarrow \frac{x^3}{3}+\cancel{C} \rightarrow \frac{x^3}{3}\Big|_0^3$$

$$\rightarrow 9-0=9$$

$$\int_0^3 -2\,dx \rightarrow -2x+\cancel{C} \rightarrow -2x\Big|_0^3$$

$$\rightarrow -6-0=-6$$

$9-(-6)$ or $9+(-6)$?

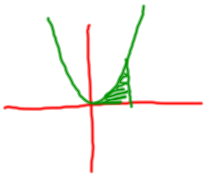
$$\begin{array}{r} 9 \\ +6 \\ \hline 15 \end{array}$$

$$\text{Area} = \int_0^3 \text{Top}(x) - \text{Bottom}(x)\,dx$$

$$\int_0^3 x^2-(-2)\,dx = \int_0^3 x^2+2\,dx = \left(\frac{x^3}{3}+2x\right)\Big|_0^3$$

$$=15$$

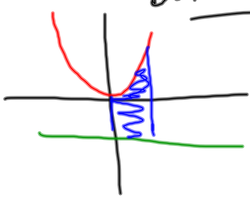
Find the area under the curve $y=x^2$ between $x=0$ & $x=3$.

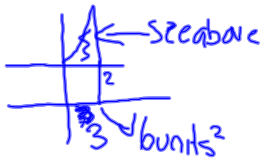


$$\text{Area} = \int_0^3 x^2\,dx = \frac{x^3}{3}\Big|_0^3$$

$$= \frac{27}{3} - \frac{0}{3} = 9$$

Find the area between $y=x^2$ & $y=-2$ between $x=0$ & $x=3$





$9+6=15$

$$\int_0^3 -2\,dx = -6$$

$$\int_0^3 x^2\,dx - \int_0^3 -2\,dx$$

$$\Downarrow$$

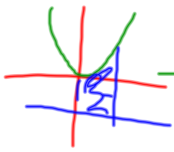
$$\frac{x^3}{3}+c\Big|_0^3 \quad - \quad -2x+c\Big|_0^3$$

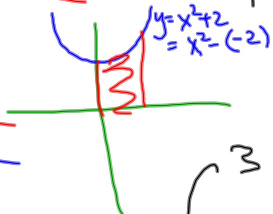
$$\Downarrow$$

$$\left[\left(\frac{3^3}{3}+c\right) - \left(\frac{0^3}{3}+c\right)\right] - \left[\left(-2(3)+c\right) - \left(-2(0)+c\right)\right]$$

$$\frac{27}{3} - \frac{0}{3} = 9 \qquad -6 - 0$$

$$9 - {}^{-}6 = 15$$





$$\text{Area} = \int_0^3 \text{Top}(x) - \text{Bottom}(x)\,dx$$

$$= \int_0^3 x^2 - (-2)\,dx = \int_0^3 x^2+2\,dx$$

$$\left(\frac{x^3}{3}+2x\right)\Big|_0^3 = (9+6) - (0+0)$$

$$= 15$$

fnInt$(x^2+2, x, 0, 3)$

MATH 9

nDer(fn, X, #)

MATH 8

$Y_1 = fn$

$Y_2 = \text{fnInt}(Y_1, X, 0, X)$

$Y_3 = \text{nDer}(Y_1, X, X)$

4. $x = y^2 - 4y$
$x = -y^2 + 2y$

$\to$ $y = x^2 - 4x$
$y = -x^2 + 2x$

$\downarrow$

$x^2 - 4x = -x^2 + 2x$

$\downarrow$

$0 = -2x^2 + 6x$

$\int_0^3 -2x^2 + 6x$

$\downarrow$

$\left(\frac{-2(3)^3}{3} + \frac{6(3)^2}{2}\right) - 0$

$\downarrow$

$-18 + 27 - 0$

$\downarrow$

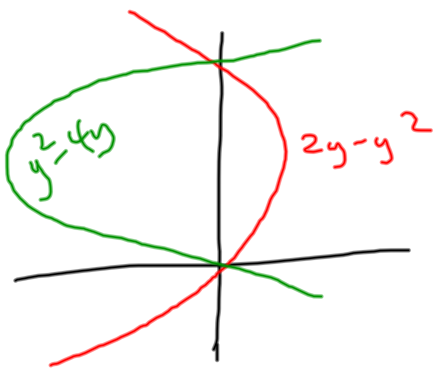
9 ? maybe? hopefully?

$\int_0^3 2x^2 - 6x \, dx$

$\Rightarrow -9$

S-word function reverse

Area = $\int_0^3$



$$\text{Area} = \int_0^3 (2y - y^2) - (y^2 - 4y) \, dy$$

7.1 examples

2011-01-11 Pd 2